

Hang Deng

Department of Civil and Environmental Engineering
Princeton University
Princeton, New Jersey 08544

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EDUCATION:

- PhD candidate, Civil and Environmental Engineering, Princeton University 2015
- Graduate certificate in Science, Technology, and Environmental Policy (STEP), Woodrow Wilson School of Public and International Affairs, Princeton University 2015
- M.A. Civil and Environmental Engineering, Princeton University 2012
- B.A. China Center for Economic Research, Peking University 2009
- B.S. School of Environmental Sciences, Peking University 2009

RESEARCH EXPERIENCE:

- **Research Interests:** Reactive Flow in Fractured Porous Media, Environmental Geochemistry, Leakage Risk Evaluation of Geological Sequestration of CO₂, Energy System, Carbon Mitigation Technologies
- **Doctoral Dissertation:**
 - Reactive Transport in Fractured Porous Media and Its Implications to Subsurface Energy Technologies
- **Research project for STEP certificate:**
 - Independent and structured study on economic evaluations of carbon mitigation technologies in the energy system and the policy implications
- **Postgraduate Research Program at the National Energy Technology Laboratory**, Morgantown, WV, Summer, 2013
 - Studied on visualization of fracture geometry evolution caused by acid-rock interactions

COURSE WORK AND TRAINING:

- **Course Highlights:**
 - Environmental Engineering Fundamentals
 - Advanced Aqueous Chemistry
 - Buoyancy Effects in Fluids
- **Additional Training**
 - Research Experience in Carbon Sequestration (RECS) summer program, Birmingham, Alabama, USA, June, 2011
 - IEA Greenhouse Gas R&D Programme (IEAGHG) international CCS summer school, Champaign, Illinois, July, USA, 2011
 - EAWAG Gerhard Jirka Summer School on Environmental Fluid Mechanics, Luzern, Switzerland, June, 2012

TEACHING EXPERIENCE:

- **Introduction to Environmental Engineering** by Professor Catherine A. Peters, 2011
 - Held regular office hours and gave lectures at Prof Peters' absence
 - Assisted students with the course materials and graded problem sets
- **Environmental Implications of Energy Technologies** by Professor Daniel E. Giammar, 2012
 - Planned field trips to power plants, and coordinated group projects

LEADERSHIP EXPERIENCE:

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- **Founding Member and President, Princeton University China Energy Group** 2012 – present
 - Initiated and leading the panel discussion program on energy-related topics with leading experts
 - Overseeing the finance of the group, and multiple seminar series and outreach projects
- **Princeton University Graduate Consulting Club** Summer, 2014
 - Volunteered for the 2014 Summer Volunteer Consulting Initiative, and partnered with local NGOs to develop strategies for client specified goals
- **Princeton Energy and Climate Scholar (PECS)** 2011 – Dec, 2013
 - Attended UN Rio +20 Earth Summit in 2012 to promote interdisciplinary student groups
 - Collaborated with local NGO on Campus Energy Efficiency Initiative in India
- **Treasurer, Inter-University Student Initiative in Carbon Sequestration (ISICS)** 2010 – 2012
 - Managed the finance of the group
 - Co-organized the ISICS fall meeting 2011

PUBLICATIONS:

- **H. Deng**, J.P. Fitts, C.A. Peters, L. Li, D. Crandall, G.S. Bromhal. Experimental study of reactive flow in an Eau Claire fracture exposed to CO₂-rich brine. 2013: American Rock Mechanics Association, paper 13-592.
- **H. Deng**, B.R. Ellis, C.A. Peters, J.P. Fitts, D. Crandall, G.S. Bromhal, (2013), Modifications of carbonate fracture hydrodynamic properties by CO₂-acidified brine flow. *Energy & Fuels*, 27(8), 4221-4231.
- J.P. Fitts, B.R. Ellis, **H. Deng**, C.A. Peters. Invited “Geochemical controls on fracture evolution in carbon sequestration”. 2012: American Rock Mechanics Association, paper 12-549.
- **H. Deng**, F. Zhao, X. Zhao, (2012), Changes of extreme temperature events in Three Gorges area, China. *Environmental Earth Science*. 66:7, 1783-1790.
- H.Y. Dou, **H. Deng**, X.M. Sun, X.Y. Zhao, (2010), Short-term temperature and precipitation forecast over Tibetan Plateau using mean generating function-optimal subset regression. *Acta Scientiarum Naturalium Universitatis Pekinensis*, 46: 643-648.
- F. Zhao, **H. Deng**, X. Zhao, (2010), Rainfall regime in Three Gorges area in China and the control factors. *International Journal of Climatology*, 30: 1396–1406.

SUBMITTED AND IN PREPARATION:

- **H. Deng**, J.M. Bielicki, M. Oppenheimer, J.P. Fitts, C.A. Peters. Policy Implications of Monetized Leakage Risk from Geologic CO₂ Storage Reservoirs. *Energy Procedia*. DOI: 10.1016/j.egypro.2014.11.719
- **H. Deng**, J.P. Fitts, C.A. Peters. X-ray CT Image Segmentation for fractured rock – introduction of the Technique of Iterative Local Thresholding (TILT). Target journal: *Computational Geosciences*.

PRESENTATIONS:

- **H. Deng**, J.P. Fitts, D. Crandall, D. McIntyre, C.A. Peters, “Permeability evolution of fractured limestone due to reactive flow: Observation and prediction of wormhole formation”, AGU Fall Meeting, San Francisco, CA, 2014.
- C.A. Peters, **H. Deng**, J.M. Bielicki, J.P. Fitts, M. Oppenheimer, “How CO₂ Leakage May Impact the Role of Geologic Carbon Storage in Climate Mitigation”, AGU Fall Meeting, San Francisco, CA, 2014.
- J.P. Fitts, **H. Deng**, C.A. Peters, “How Reactive Fluids Alter Fracture Walls and Affect Shale-Matrix Accessibility”, AGU Fall Meeting, San Francisco, CA, 2014.

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- C.A. Peters, **H. Deng**, B. Guo, J.P. Fitts, “Challenges in Reactive Transport Modeling for Prediction of Geometry Evolution in Fractured Carbonate Rocks”, **INVITED**, AGU Fall Meeting, San Francisco, CA, 2014.
- **H. Deng**, J.M. Bielicki, M. Oppenheimer, J.P. Fitts, C.A. Peters, “Policy Implications of Monetized Leakage Risk from Geologic CO₂ Storage Reservoirs” Oral, International Conference on Greenhouse Gas Technologies (GHGT), Austin, TX, Oct 2014.
- C.A. Peters, **H. Deng**, J.P. Fitts “New Reactive Transport Challenges for Acidified Flows in Fractured Carbonate Rocks” **INVITED** Abstract H35C-1425 presented at 2013 Fall Meeting, AGU, San Francisco, CA Dec 2013.
- J.P. Fitts, **H. Deng**, R. Tappero, C.A. Peters “Spatial Variation of Dissolution at Fracture Boundaries” Goldschmidt 2013. Mineralogical Magazine, **77(5)** 1092.
- J.P. Fitts, **H. Deng**, R. Tappero, C.A. Peters “Exploring Geochemically Driven Evolution of Vertical Fractures in Tight Sedimentary Rocks”. 2013 AEESP 50th Anniversary Conference, Environmental Engineers and Scientists of 2050: Education, Research, and Practice. Colorado School of Mines, July 2013.
- **H. Deng**, C.A. Peters, J.P. Fitts, D. Crandall, G. Bromhal, L. Li “Impacts of Reactive Fluids on Fracture Flows in the Context of Subsurface Energy Technologies”. 2013 AEESP 50th Anniversary Conference, Environmental Engineers and Scientists of 2050: Education, Research, and Practice. Colorado School of Mines, July 2013.
- A.F. Clarens, J.P. Fitts, S. Wang, Z. Tao, C.A. Peters, **H. Deng**, “Geochemically Driven Evolution of Mineral Surfaces: Impacts on Leakage Processes from Geologic Carbon Sequestration Sites” 2013 AEESP 50th Anniversary Conference, Environmental Engineers and Scientists of 2050: Education, Research, and Practice. Colorado School of Mines, July 2013.
- **H. Deng**, J.P. Fitts, R. Tappero, C.A. Peters, S. Wirick, W. Rao. “X-ray imaging studies of water-rock interactions at fracture surfaces during fluid flow”, 2013 National Synchrotron Light Source/Center for Functional Nanomaterials (NSLS/CFN) Joint Users’ Meeting, Brookhaven National Lab, Upton, NY, May 20-22, 2013.
- A.F. Clarens, S. Wang, B. Liang, C.A. Peters, J.P. Fitts, **H. Deng**, B.R., Ellis, “An Integrated Experimental Program to Understanding Leakage from Geologic Carbon Sequestration Sites across Scales”, Abstract H14D-05 presented at 2012 Fall Meeting, AGU, San Francisco, CA, 3-7, Dec.
- **H. Deng**, B.R. Ellis, C.A. Peters, J.P. Fitts, D. Crandall, G. Bromhal “Modification of fracture hydrodynamic properties by CO₂-acidified brine flow”. 2012 AIChE Annual Meeting, Nov 2012.
- J.P. Fitts, B.R. Ellis, **H. Deng**, R. Tappero, C.A. Peters, “Calcite Dissolution and Caprock Fracture Surface Deterioration at High P/T: Dependence on Reactive Fluid Velocity and Mineral Spatial Heterogeneity”, NSF CMMI Engineering Research and Innovative Conference, Program Area: Geomechanics and Geomaterials, C133, Boston, MA July 2012.
- **H. Deng**, D. Crandall, S. King, B.R. Ellis, G. Bromhal, J.P. Fitts, C.A. Peters, “Change in Fracture Permeability after the Flow-through of CO₂-acidified brine”, AGU Fall Meeting, San Francisco, CA, Dec, 2011.
- **H. Deng**, C.A. Peters, J.P. Fitts, M. Pollak, E. Wilson, “Hydrogeological characterization of a potential CO₂ injection site in Ottawa County, Michigan”, AGU Fall Meeting, San Francisco, CA, 2010.

SKILLS:

- **Technical:** Matlab, ArcGIS, Microsoft Word, Excel, and PowerPoint, Global Change Assessment Model (GCAM), Dynamic Integrated Climate-Economy (DICE) model, SPSS, ImageJ, LabVIEW, OpenFOAM, PHREEQC, C++

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- **Language:** Native in Mandarin